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TECHNOLOGY ASSESSMENTS IN THE US DEPARTMENT OF
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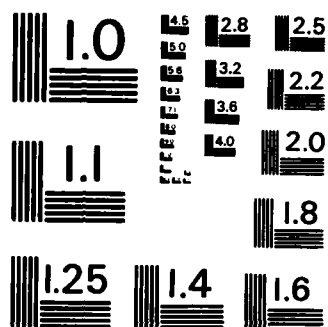
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16. Abstract <p>In September 1975 the Congressional Office of Technology Assessment (OTA) requested from the Department of Transportation "a list of activities...which, although perhaps not described as such by name, might properly be classed as technology assessments." This list of programs summarized in this document was the result of this query.</p> <p>Major ongoing or completed technology assessments are covered in the summary, which is divided into seven areas: (1) General or Multimodal Assessments; (2) Highway System Assessments; (3) Air System Assessments; (4) Rail System Assessments; (5) Urban Assessments; (6) Energy Assessments, and (7) Environmental Assessments.</p>					
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I. GENERAL OR MULTIMODAL ASSESSMENTS

The Department has conducted a number of major analyses of multimodal systems, usually focusing on defining the relative roles of transportation system alternatives. Among others, these have included the following:

- The Northeast Corridor Transportation Project, final reports released September 1971
- The Short-Haul Transportation Analysis for Research and Development (STAR Study), contractor reports completed September-November 1971
- The High Speed Ground Alternatives Study, report released January 1973
- The analysis supporting DOT's Transportation Tunneling Program, ongoing
- The NASA/DOT Technology Assessment of Intercity Transportation, ongoing
- Technological Forecasts, 1975-2000

The Department's National Transportation Study also makes a major contribution to this data base. In addition, the Department has supported major corridor studies in specific localities. Notable among these are the Sacramento-San Francisco Corridor Study and the upcoming West Coast (Tijuana-Vancouver) Corridor Study.

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TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Office of the Assistant Secretary for Policy,
Plans and International Affairs

PROGRAM TITLE: Northeast Corridor Transportation Project

PROGRAM DESCRIPTION:

This program was a five-year study of transportation needs and problems in the Northeast (Boston-Washington) Corridor. Various modes of air and ground transportation were examined. The analysis concluded that improving the rail system in the corridor was necessary to meet the needs of intercity public transportation in the 1970's. Recommendations for improved use of present highway capacity were also put forward for implementation early in the decade.

The Report left open the alternatives for the 1980's and called for a diversified and vigorous program of technological research and development to explore the possibilities. Decisions on the "next generation" systems were to be made by 1976.

A theme in the recommendations for the 1970's was the need to make more effective use of existing transportation systems capacity rather than introducing new technology systems that will require large and costly new facilities in densely populated areas. Avoiding the construction of such facilities is not only economical, but reduces the heavy environmental and social costs often associated with the disruption of densely settled regions.

CONTACT FOR FURTHER INFORMATION:

I. Dye, TPI-10, Ext. 64220

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Office of the Assistant Secretary for Systems,
Development and Technology

PROGRAM TITLE: Short-haul Transportation Analysis for Research and
Development (STAR Study)

PROGRAM DESCRIPTION:

This study was a series of three parallel analyses of short-haul transportation (50-500 miles) to provide a base for research and development on these systems. One analysis took an overview of these systems, performing a "macro-analysis" of performance of various alternatives. A second analysis examined specific short-haul system problems, with a particular emphasis on system costs. The third analysis examined a specific region (the San Diego and San Francisco Corridor) and evolved an assessment methodology which was subsequently operationalized at the Transportation Systems Center.

CONTACT FOR FURTHER INFORMATION:

A. Linhares, TST-12, Ext. 64228

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Office of the Assistant Secretary for Policy,
Plans and International Affairs

PROGRAM TITLE: High Speed Ground Alternatives Study

PROGRAM DESCRIPTION:

A comprehensive analysis was conducted of the economic, technological, and institutional factors involved in implementing improved passenger train service and high speed tracked levitated vehicle systems in the United States. The study concluded that the potential benefits and markets are sufficient to warrant federal activity in reserach and development for both. Of special note is the evaluation of system viability and benefits under future situations involving serious petroleum fuel shortages.

CONTACT FOR FURTHER INFORMATION:

I. Dye, TPI-10, Ext. 64220

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Office of the Assist Secretary for Systems,
Development and Technology

PROGRAM TITLE: Transportation Tunneling Program

PROGRAM DESCRIPTION:

DOT's Transportation Tunneling Program is designed to develop and demonstrate advanced techniques for constructing transportation tunnels, reduce costs by at least 30 percent and increase construction rates by 100 to 200 percent by the 1980's, and to minimize the environmental impact of tunnels. The program continues a comprehensive, coordinated investigation of new tunneling technology carried out through several groups at DOT including TST, FRA, UMTA, and FHWA. Areas of research activity within the modal administrations include site investigation, ground movement prediction and control, cut and cover tunneling technology, novel excavation techniques (laser, water cannon), liner innovations, urban muck disposal, and the study of industry issues and problems. In addition, each mode works on special problems which are peculiar to its needs such as traffic controls, transition lighting, etc.

CONTACT FOR FURTHER INFORMATION:

Russell McFarland, TST-45, Ext. 69638

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Office of the Assistant Secretary for Systems,
Development and Technology

PROGRAM TITLE: Joint NASA/DOT Intercity Transportation Technology
Assessment study

PROGRAM DESCRIPTION:

The study will assess the technical, economic, environmental, and socio-political issues associated with intercity transportation system options, and will determine research and technology (R&T) directions that appear most promising. Emphasis will be on domestic passenger transportation, although freight and international transportation will be considered.

Assisting NASA and DOT is a joint industry/university team consisting of Peat, Marwick, Mitchell & Co., the prime contractor, and the University of California, Berkeley, Stanford University, and Gellman Research Associates, Inc.

In the early months of the 13-month study, the study team members will be conducting a broad scale evaluation of intercity transportation system options to the year 2000, with a further look to 2025. This evaluation will be carried out within the framework of a number of scenarios describing the future state of the nation.

Roughly 40 nationally recognized "Study Participants" will be asked to take part in the project, representing a variety of interests, including technology, transportation policy, economics, consumer interests, environment and resource consumption, operators and unions, and governmental institutions. The Study Participants will review interim reports prepared by the Study Team prior to the workshop, attend the workshop, and review subsequently developed recommendations on NASA and DOT programs.

CONTACT FOR FURTHER INFORMATION:

B. Bartholow, TST-13, Ext. 64347

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Office of the Assistant Secretary for Policy,
Plans and International Affairs

PROGRAM TITLE: Technological Forecasts, 1975-2000, A Descriptive
Outlook and Method for Quantitative Prediction

PROGRAM DESCRIPTION:

A description of expected trends in transportation for both passenger
and freight movements for the next 30 years.

A methodology is also described for forecasting, at an aggregate level
of detail and as a function of time value, out of pocket costs and trip
distance, the modal split of passengers in a forecast year between
1975-2000.

CONTACT FOR FURTHER INFORMATION:

Walter D. Velona, TPI-20, Ext. 69651

II. AUTO AND HIGHWAY SYSTEM ASSESSMENTS

In addition to major energy-related assessments, both the National Highway Traffic Safety Administration (NHTSA) and the Federal Highway Administration (FHWA) have active analytical efforts. NHTSA projects address the impacts of technical improvements to be mandated by new standards or regulations. Program analysis and assessments are also conducted in areas of NHTSA's ongoing driver safety programs, notably alcohol countermeasures.

FHWA projects frequently address the secondary impacts of proposed improvements or changes in operating techniques being developed for state highway and transportation departments. These assessments are used for development of general operational guidelines for the new techniques. Three FHWA projects are especially noteworthy along these lines:

- Practicality of an Automated Highway
- Requirements for Alternate Routing to Distribute Traffic Between and Around Cities
- Safety Aspects of Increased Size and Weight of Heavy Vehicles

FHWA also supports the conduct of planning and impact studies at the state levels with its Highway Planning and Research (HP&R) funds.

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Highway Administration

PROGRAM TITLE: Highway Research and Development

PROGRAM DESCRIPTION: Practicality of an Automated Highway

An adequate transportation system is one of the prime requirements of an advanced society such as the one enjoyed in the United States. Maintaining an adequate, serviceable transportation system is becoming increasingly difficult due to the many additional demands and constraints which have been developing demand. Nowhere is this demand greater than on our nation's highways which are experiencing unacceptable levels of accidents and congestion.

To meet this increased demand requires an effective national program which maximizes the efficiency of existing facilities while vigorously exploring and evaluating future systems and technologies which may enhance the overall transportation system. The FHWA, in cooperation with the states, is very active in developing traffic surveillance and control systems to improve the safety and efficiency of existing highways. Such systems are currently being implemented and will continue into the next decade. Although vital, these systems are still limited as the individual motorist with his broad range of capabilities, reflexes and driving skills is intrinsic to the system. Significant land/highway transportation improvements in the future must look to concepts which provide either automated or semi-automated control of the vehicle in high speed and/or normally congested driving situations. Automated as opposed to manual control may well be an essential evolutionary step in the future effort to provide very safe, high speed operation for key intercity and regional highways.

CONTACT FOR FURTHER INFORMATION:

Mr. Charles F. Scheffey, Director of Research, HRS-1, 426-2943

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Highway Administration

PROGRAM TITLE: Highway Research and Development

PROGRAM DESCRIPTION: Requirements for Alternate Routing to Distribute Traffic Between and Around Cities

In lieu of additional intercity and suburban freeway construction to handle the increasing load of intercity traffic, highway officials are seeking means to distribute such loads over existing highway facilities. Until recently, the highway community had concentrated primarily on the construction programmed to meet anticipated demands. Because actual demands were greater than predicted and the opposition to new construction was not anticipated, highway departments were largely unprepared to deal with the operation of heavily loaded traffic networks. The need for solutions has reached a point where a widespread impetus to implement operational systems has been generated. There are many approaches and various equipments that can perform the functions of surveillance and control, incident detection, motorist aid and communication. Investment in hardware and software to perform only one or a limited number of these functions is not as cost-effective as a system designed to perform all the functions in such a way that they are coordinated with each other. What is needed, then, is a system with all the equipment and operational functions integrated. Such a system is technically feasible today with modern proven equipment and off-the-shelf technology.

In addition, the FHWA alternate routing program and the Northeast Corridor Transportation Project recommendations for alternate routing via a highway information system, advanced by the Department of Transportation in late 1971, although arrived at independently, parallel each other in almost every respect in terms of problem analysis and solution requirements, differing only in geographical scope.

CONTACT FOR FURTHER INFORMATION:

Mr. Charles F. Scheffey, Director of Research, HRS-1, 426-2943

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Highway Administration

PROGRAM TITLE: Highway Safety Research and Development

PROGRAM DESCRIPTION: Safety Aspects of Increased Size and Weight
of Heavy Vehicles

The proposal to increase the allowable size and weight limitations of trucks has been shown to provide substantial economic benefits in terms of more efficient freight transportation. However, larger trucks and/or loads could have an adverse effect on the performance of trucks and/or adjacent vehicles causing a potential safety problem. The combination of increased truck sizes and weights without improved truck designs (power, braking efficiency, suspension, etc.) coupled with specific geometric features could significantly impact the quality of safety on our nation's highways.

A determination of the accident potential of such increases and the evaluation of feasible corrective measures is necessary in order to make a rational decision on the proposed size and weight limits.

Economic analyses have shown that the benefits to society of increasing the size and weight limits of trucks could amount to billions of dollars annually. But the cost to society in terms of reduced safety have been questioned. Before a rational decision can be made, it is necessary to determine whether safety is effected and whether the effects are acceptable in light of the other benefits.

CONTACT FOR FURTHER INFORMATION:

Mr. Charles F. Scheffey, Director of Research, HRS-1, 426-2943

III. AIR SYSTEM ASSESSMENTS

The Department has done or participated in a number of major assessments of the entire air system, or of new control technologies. These have included efforts like the following:

- Eight Airport Capacity Study and Current Follow-on Study
- The Air Traffic Control Advisory Committee reports, released December 1969
- The joint DOT-NASA Civil Aviation Research and Development Policy Study, released March 1971
- DOT support of the Aviation Advisory Committee, reporting January 1973
- Definitional analyses for an Advanced Air Traffic Management Systems (AATMS)
- Systems analyses to support deployment of the Upgraded Third Generation Air Traffic Control System
- The Climatic Impact Assessment Program
- The High Altitude Pollution Program
- Noise Retrofit analyses for older commercial airlines
- The Airport/Landside Project

The Federal Aviation Administration administers a planning grant program to support airport system planning and overall air system master planning.

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Aviation Administration

PROGRAM TITLE: Eight Airport Capacity Study and
Current Follow-On Study

PROGRAM DESCRIPTION:

In mid-1973, Congress requested an FAA study of the expected impact of R, E&D and F&E programs on airport capacity. The resulting two-volume report of a study of projected demand and capacity at eight major airports was submitted to Congress in January 1974. The report showed that the FAA programs will substantially benefit airport capacities. VFR capacities will increase about 25% over today, IFR will increase about 50%; IFR capacity should rise from its present level of 75% of VFR capacity to about 90%.

On-site forces are now following up this study to expedite improvements at the major hubs. These task forces are composed of the airport sponsor, airlines and local FAA with policy guidance and technical support provided by FAA headquarters. Reports will be forthcoming from five task forces during the latter part of FY-76.

CONTACT FOR FURTHER INFORMATION:

Thomas J. O'Brien, AEM-300, 426-8828

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Aviation Administration

PROGRAM TITLE: Air Traffic Control Advisory Committee

PROGRAM DESCRIPTION:

The report identified problems with the capacity and cost of the ATC System and recommended:

- 1) An upgrading of the radar beacon system to include a data link;
- 2) Automatic separation assurance via the data link of the improved beacon;
- 3) Microwave Landing System;
- 4) Increased use of automation;
- 5) Improvements in terminal capacity;
- 6) Investigations into the applicability of satellites to future aeronautical systems.

The FAA has mounted efforts in response to each of these recommendations and has developed and demonstrated prototype equipment.

CONTACT FOR FURTHER INFORMATION:

Thomas S. Amlie, AEM-20, 426-3679

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Aviation Administration

PROGRAM TITLE: Civil Aviation Research and Development
Policy Study - March 1971

PROGRAM DESCRIPTION:

This study, which was conducted jointly by DOT-NASA, presented a comprehensive review of policies affecting civil aviation, of the problems confronting it, and of the potential it possesses for future contributions to the Nation, as specifically related to research and development activities. The findings are summarized below:

1. Research and Development has produced dramatic improvements in aircraft performance, economy, reliability, and safety.
2. Research and Development is necessary to allow continued growth and make civil aviation more available and acceptable, but the benefits are constrained by regulations, social impacts, financial conditions, and organizational problems.
3. The major emphasis of civil aviation R&D should be directed toward noise abatement, airport congestion, and short-haul service.
4. Research and Development programs should be broad-based.
5. Potential costs of not doing R&D are high.

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Aviation Administration

PROGRAM TITLE: Report of the Aviation Advisory
Commission - January 1975

PROGRAM DESCRIPTION:

This report outlined the Commission's views on the long range needs of the Nation's Aerospace Transportation System to allow it to be an integral part of the world's total transportation system; to provide sufficient capacity to satisfy the reasonable demands of the users; and to present a technically, economically and politically sound approach to improving the system while maintaining harmony with the environment. The conclusions identified:

1. Immediate problems (which were related to reducing noise, improving the financial health of the aerospace industry, and reorganizing the DOT to concentrate responsibilities under an Under Secretary for Civil Aviation).
2. The future system (which was concentrated on quieting air vehicles, reducing airport congestion, distributing air traffic management between the pilot and controllers through the introduction of an Air Traffic Situation Display, and enhancing ground access to airports).
3. Implementation (which included more State planning and enforcement activities; expanded subsidizing to serve small communities, segregation of airspace for low performance and recreational aircraft, and greater Federal financing for airports with more liberal regulations of airlines).

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Department of Transportation
Transportation Systems Center

PROGRAM TITLE: Advanced Air Traffic Management System Study

PROGRAM DESCRIPTION:

In looking beyond the 1980's the Advanced Air Traffic Management System Study was concerned with formulating a system concept that could supplant the Upgraded Third Generation System. Based on evolution from this system, the AATMS Study considered various concepts for a system of the 1990's. The Study had three basic phases. The first phase was the Concept Formulation or "clean sheet of paper" phase in which feasible concept alternatives were considered without imposing the traditional constraint of evolutionary transition from the in-being system. In the second phase of the Study, the definition of a satellite-based system concept, including a plan to transition from the Upgraded Third Generation System, was generated. As an alternative to such an All-Satellite System, an extension of the Upgraded Third Generation System into the projected environment of the 1990's was also defined: namely, the Extended Upgraded Third Generation System. In the final Assessment and Integration phase of the Study, these two system mechanization concepts were compared and the best features of each were used in determining the final AATMS mechanization concept.

From these study efforts a specified Advanced Air Traffic Management System concept emerged. A concept derived from an evolutionary extension of the Upgraded Third Generation System, it builds on that system's equipment, facilities, and subsystems. Flow Control/Intermittent Positive Control, Metering and Spacing, Separation Assurance and Strategic Control are important techniques used in the concept to assist and control aircraft traffic flow. The concept employs highly centralized facilities to provide both control and flight information/assistance services. High levels of automation are used to minimize costs and to permit operators to serve as system managers, acting principally to resolve unusual control situations. Achieving the benefits projected for the Advanced Air Traffic Management System, however, will require additional research and development effort. These activities, supplementing the present FAA Engineering and Development Program, were identified in the final phase of the AATMS Study. Basically the research and

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Aviation Administration

PROGRAM TITLE: Upgraded Third Generation Air Traffic
Control System (UG3RD)

PROGRAM DESCRIPTION:

In August 1974, the Department of Transportation completed a staff study on the Upgraded Third Generation Air Traffic Control System (UG3RD). The staff study concluded that further analyses were necessary to provide the basis for making Departmental decisions in this development program. These analyses include both technical alternative and cost/benefit studies.

As a result of the OST Staff Study, the FAA formed a study team to answer the questions and perform the analyses. This activity is now underway on a firm schedule for the various analyses, and is being conducted in close coordination with the Office of the Secretary of Transportation.

CONTACT FOR FURTHER INFORMATION:

Edward Van Duyne, AEM-300, 426-9553

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Department of Transportation

PROGRAM TITLE: Climatic Impact Assessment Program

PROGRAM DESCRIPTION:

The Climatic Impact Assessment Program (CIAP) was initiated in FY-72 to evaluate possible environmental effects of a worldwide fleet of high-flying subsonic and supersonic aircraft which may be in service by 1990. Work under CIAP included the evaluation of existing data, the institution of field and laboratory programs to collect new or improved data on the nature of the stratosphere and of possible aircraft engine effluents, and the development of models to assess the impact of effluents in the stratosphere.

CIAP considered in detail two types of environmental impact. One was decreases in ozone due to the introduction of oxides of nitrogen in the stratosphere from aircraft and the other was an increase in the stratospheric aerosol layer due to introduction of sulfur dioxide also in the stratosphere from aircraft. In addition, there was consideration of the effects of water vapor and carbon dioxide from aircraft. The ozone decrease would lead to an ultraviolet decrease and an increase in human skin cancer. The increase in the stratospheric aerosol layer would generally tend to cause cooling of the earth. Water vapor and carbon dioxide emissions might also have climatic effects. CIAP reported its findings in December 1974 to the effect that a potentially serious problem existed, and that steps should be taken to avert the problem.

CONTACT FOR FURTHER INFORMATION:

Alan J Grobecker, TST-2.1, 426-9676

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Aviation Administration

PROGRAM TITLE: High Altitude Pollution Program

PROGRAM DESCRIPTION:

The High Altitude Pollution Program (HAPP) of the FAA was initiated in January 1975 to quantitatively determine the requirements for reduced cruise-altitude emission by aircraft and, in conjunction with the Environmental Protection Agency and the International Civil Aviation Organization, to ensure that, if necessary, appropriate regulatory action is taken to avoid environmental degradation. The major concern of HAPP is with the effects of the oxides of nitrogen, which are present in the exhaust of jet aircraft. When these oxides of nitrogen are released in the stratosphere, they tend to decrease the amount of ozone. In turn, this increases the amount of ultraviolet radiation reaching the earth's surface, and is believed to increase the incidence of skin cancer in susceptible human populations. A second area of concern is possible climatic effects caused by release from aircraft of sulfur dioxide, water vapor, and carbon dioxide in the stratosphere. The sulfur dioxide may cause an increase in the natural stratospheric aerosol layer. The increase in the aerosol layer or in the amount of water vapor or carbon dioxide may lead to small changes in the earth's climate.

HAPP undertakes to review what is known about possible stratospheric effects of aircraft; to perform additional investigations in the laboratory or atmosphere, as needed; to improve the knowledge of aircraft engine emissions; to obtain realistic forecasts of world aircraft fleet operations; and to use all this information to assess the need for regulation of stratospheric flight in order to avoid harmful consequences for the environment.

CONTACT FOR FURTHER INFORMATION:

Joan B. Barriage, AEQ-2, 426-8406

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Aviation Administration

PROGRAM TITLE: Noise Retrofit Analysis

PROGRAM DESCRIPTION:

This program consists of the following elements:

- Development of flight-worthy aircraft engine nacelles containing Sound Absorbing Material (SAM) for JT3D and JT8D engined aircraft;
- Flight test of aircraft retrofitted with acoustically treated material;
- Analysis of cost of retrofitting U. S. air carrier fleet with new nacelles;
- Analysis of the noise level reductions and benefits derived therefrom for the U. S. population living around airports;
- Analysis of the impact of a retrofit program on the U. S. economy.

The analysis brought together all of the technical and economic factors into a single benefit cost function which was then employed to provide quantitative input into the decision as to whether or not a rule to require retrofit of older aircraft with new nacelles containing the new technology would be promulgated.

CONTACT FOR FURTHER INFORMATION:

Harvey Safeer, AEQ-100, 426-8722

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Aviation Administration

PROGRAM TITLE: The Airport/Landside Project

PROGRAM DESCRIPTION:

This program is directed towards correcting or removing landside restrictions to airport capacity and operations. Specifically, the program involves the following:

1. Reviewing planned or actual efforts in landside areas.
2. Formulate measures to establish levels of service and standardized methodologies for determining landside capacity.
3. Determine the desirability of utilizing simulation models for assessing projected improvements in landside capacity.
4. Additional studies of methods to balance an airport's landside and airside capacity will be investigated along with methods of providing airport managers' guidance in this area.

The above efforts will be initiated to determine the feasibility of utilizing new landside transportation techniques at various airports. As an example, an accelerating walkway scheduled for installation at LaGuardia Airport, New York, New York, will be evaluated and its applicability to other airports' installations determined.

CONTACT FOR FURTHER INFORMATION: Richard J. Marek, AEM-200, 426-8794

IV. RAIL SYSTEM ASSESSMENTS

In addition to many assessments of high-speed ground systems (See Section I, General or Multimodal Assessments), the Federal Railroad Administration has a major ongoing analytical program to examine problems of the rail industry. Among others, these include the following:

- Rail Industry Cost Analysis
- Rail Commodity Service Analysis
- Systems Analysis and Supporting Technology for Improved Rail Freight Service
- Railroad Classification Yard Technology Assessment
- Advanced Braking Concepts - Opportunities for Innovation in Railroad Freight Car Braking Systems
- Assessment of Automatic Coupling Systems for Railroad Freight Cars.
- Freight Car Management Systems and Analysis
- Passenger Service Analysis

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Railroad Administration

PROGRAM TITLE: Rail Industry Cost Analysis

PROGRAM DESCRIPTION:

This program develops methods to determine investment and operating cost changes associated with change in rail transportation activity and for individual rail movements. The application of these sophisticated cost control techniques to the rail industry will contribute to the efficiency and effectiveness of the railroads.

CONTACT FOR FURTHER INFORMATION:

Wilbert Cantey, RPD-1, Ext. 60933

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Railroad Administration

PROGRAM TITLE: Rail Commodity Service Analysis

PROGRAM DESCRIPTION:

This program focuses on improving the efficiency of transporting principal commodities by rail. Specifically, the potential for large-scale productivity improvements in the physical distribution systems of principal rail-carried commodities is being assessed.

CONTACT FOR FURTHER INFORMATION:

Wilbert Cantey, RPD-1, Ext. 60933

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Railroad Administration

PROGRAM TITLE: Railroad Systems Analysis and Supporting Technology

PROGRAM DESCRIPTION:

The objective of this program is to perform systematic analyses to develop sound and timely project definitions that ultimately contribute to optimized payoffs, from the expenditure of research and development resources. This effort provides continual inputs to cost/benefit trade-off studies involving all of the program elements of the improved rail freight service program.

CONTACT FOR FURTHER INFORMATION:

P. Loekszyk, RRD-10, ext. 51877

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Rederal Railroad Administration

PROGRAM TITLE: Railroad Classification Yard Technology Assessment

PROGRAM DESCRIPTION:

This program will survey and assess the state-of-the-art in rail freight classification yard technology. The immediate goal is to provide the data base necessary for the development and evaluation of research and development plans and activities in the area of rail classification yard technology. The objective is to provide one of the bases of a program designed to assist the railroad community in improving the quality of rail freight service with the focus on more efficient and reliable terminal operations. In order to meet this objective a study is being undertaken to provide the following information:

- (1) establishment of a detailed description of the hardware, costs, performance characteristics, and operational practices of existing yards;
- (2) formulation of general yard-network interaction concepts;
- (3) collection of detailed background information concerning the yard population, in the U.S.;
- (4) estimation of the demands likely to be placed on the nation's network of classification yards during the foreseeable future, and
- (5) an assessment and prioritizing of those yard operations which warrant further technological research or development.

CONTACT FOR FURTHER INFORMATION:

Arne J. Bang, RRD-12, Ext 60855
William F. Cracker, Jr., RRD-12, Ext. 60855

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Railroad Administration

PROGRAM TITLE: Advanced Braking Concepts -- Opportunities for
Innovation in Railroad Freight Car Braking Systems

PROGRAM DESCRIPTION:

This program calls for a study of alternative rail freight car braking systems to determine the degree to which any represent practical improvements in the efficiency and safety of railroad freight service. Estimation of the costs, benefits, and overall transportation impact associated with alternative or innovative technology requires a broad range of data and a complete understanding of complex interactions.

The study will evolve in two stages. First, establishment of a detailed characterization of the existing, in-service, air brake system as a basis for comparison will be made. Then, second, will be identification and assessment of alternatives to the existing system. The specific tasks include: (1) a detailed delineation of the functional performance offered by the present air brake system, including as wide a range of available optional equipment as possible; (2) establishment of detailed life-cycle cost information for the existing system; (3) identification of areas in which the present system could be improved; (4) identification of alternative braking techniques/concepts; (5) analysis of those alternatives, in terms of applicability to freight operations, and finally (6) the establishment of a recommended research and development plan.

CONTACT FOR FURTHER INFORMATION:

Arne J. Bang, RRD-12, Ext. 60855
Grace R. Fay, RRD-12, Ext. 60855

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Railroad Administration

PROGRAM TITLE: Assessment of Automatic Coupling Systems for
Railroad Freight Cars

PROGRAM DESCRIPTION:

This program will identify, classify, and analyze all the significant concepts related to rail freight car coupling systems which offer a potential for an improvement in safety and operational cost over the system presently in use. The objective is to select the more promising functional concepts and arrange them into a small number of logical candidate systems or combination of these systems which warrant further investigation.

An objective feasibility study based on preliminary engineering and cost analysis will be made. The vast variety of work already done attempting to advance the state-of-the-art will be identified and the more promising concepts emphasized. Any development effort required to bring these concepts into use will also be delineated.

CONTACT FOR FURTHER INFORMATION:

Arne J. Bang, RRD-12, Ext. 60855
Grace R. Fay, RRD-12, Ext. 60855

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Railroad Administration

PROGRAM TITLE: Freight Car Management Systems Analysis

PROGRAM DESCRIPTION:

These analyses are designed to solve problems using short-term, conventional strategies. The program provides for analysis of railroad operations management, problem definition, and research into short-run policy alternatives and strategies for improvement that can be implemented using existing management capabilities.

CONTACT FOR FURTHER INFORMATION:

Wilbert Cantey, RPD-1, Ext. 60933

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Railroad Administration

PROGRAM TITLE: Passenger Service Analysis

PROGRAM DESCRIPTION:

This program involves a study to determine criteria for establishment of rail-bus through rates and routes in specific areas. Such integration will provide service to areas lacking passenger rail facilities. The program provides input into the proper role of rail in overall passenger transportation policy.

CONTACT FOR FURTHER INFORMATION:

Wilbert Cantey, RPD-1, Ext. 60933

V. URBAN ASSESSMENTS

The Department has conducted many systems analyses of entire urban transportation systems, present and future, as well as elements of these systems. Impact studies of existing transportation systems have also been conducted. These projects have ranged over many areas, including the following:

- The Urban Corridor Demonstration Program evaluation components
- The Service and Methods Demonstration Program evaluation components, ongoing
- The BART Impact Program, ongoing
- The METRO Impact Study, ongoing
- The Analysis of Dual Mode Systems in an Urban Area (Boston), issued December 1973
- Automated Guideway Transit Assessment
- Experimental Design

In addition, Urban Mass Transportation Administration (UMTA) technical studies funds support planning and alternative evaluation at the local level, and UMTA Research and development funds sponsor analytical studies and assessments of technology and socio-economic factors related to automated guideway transit systems.

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: U.S. Department of Transportation, Office of the Secretary, Office of Environmental Affairs

PROGRAM TITLE: Evaluation of the Urban Corridor Demonstration Program (UCDP)

PROGRAM DESCRIPTION:

The Urban Corridor Demonstration Program was initiated in 1970 to test and demonstrate the use of available highway traffic engineering and transit operations technology to relieve congestion in urban commuter corridors. The program has emphasized efficient management of existing transportation systems through the use of low capital intensive improvements which can be rapidly implemented, rather than through the use of major new construction.

The evaluation component of the UCDP has been designed to ensure that all projects are fully evaluated and results given the widest possible distribution and application. Evaluation goals have been to: (a) provide technical assistance to program participants in their data collection and analysis efforts, (b) provide for standardization of evaluation techniques throughout the seven participating cities, and (c) draw conclusions as to the effectiveness of Corridor projects and their costs and benefits, and as to the UCDP as a whole.

FUNDING: FY 73 - \$35,000 FY 74 - \$41,000 FY 76 - \$41,000

CONTACT FOR FURTHER INFORMATION: John T. Stahr, TES-70, x426-4388

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Urban Mass Transportation Administration

PROGRAM TITLE: Service and Methods Demonstration Program, Evaluation
Components

PROGRAM DESCRIPTION:

As part of this program, techniques to reduce travel time, increase transit coverage, reliability and productivity, and serve the transit dependent, are being developed and tested in urban areas. These include fringe parking, buses on reserved lanes, dial-a-ride, fare variations, and special services for the handicapped and elderly. Each demonstration is evaluated and results shared with public officials, transit planners and operators, and the interested public.

CONTACT FOR FURTHER INFORMATION:

R. Fisher, UTP-30, Ext. 64984

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Office of the Assistant Secretary for Policy,
Plans and International Affairs

PROGRAM TITLE: BART Impact Program

PROGRAM DESCRIPTION:

The BART Impact Program is designed to assess the impact of the Bay Area Rapid Transit System (BART) on the San Francisco Bay area. The program has focused on six major areas: Environment, Land Use and Urban Development, Institutions and Life Styles, Economics and Finance, and Public Policy. The Metropolitan Transportation Commission (MTC) of the San Francisco Bay Area serves as prime contractors.

CONTACT FOR FURTHER INFORMATION:

G. Grainger, TPI-10, Ext. 64220

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Urban Mass Transportation Administration

PROGRAM TITLE: METRO Impact Study

PROGRAM DESCRIPTION:

As part of its ongoing planning programs, the Washington Area Council of Governments is conducting for UMTA an assessment of impacts of the METRO rail system in the Washington area. The program is somewhat narrower in scope than the BART Impact Work, with more extensive consideration of construction impacts.

CONTACT FOR FURTHER INFORMATION:

J. Ettinger, UTP-20, Ext. 64991

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Office of the Assistant Secretary for Systems
Development and Technology

PROGRAM TITLE: Analysis of Dual Mode Systems in an Urban Area

PROGRAM DESCRIPTION:

Various forms of Dual Mode transportation were analyzed in order to assess the economic viability of the Dual Mode concept. A Dual Mode vehicle is one which operates under manual control on a street network for some portion of its trip, and operates under automatic control on an exclusive guideway for some other portion. Specially designed new small Dual Mode vehicles, modifications of existing automobiles, and pallet systems, all operating in conjunction with Dual Mode buses, were examined. The study was conducted in a Boston 1990 scenario, in which an extensive Dual Mode system providing service for the entire urban region was presumed to exist. This study was not intended to be a proposal for Dual Mode in Boston. The following conclusions are considered to be generally applicable to other large urban areas as well: (a) Dual Mode systems appear to be sufficiently attractive to warrant further technological development; (b) for urban-wide applications, a Dual Mode system which includes both buses and personal vehicles is more effective than one consisting of either fleet of vehicles alone; (c) a Dual Mode transportation system benefits from the use of various Dual Mode concepts throughout its development.

An effective first step might be to install a limited network Dual Mode minibus system, with capacity for ultimate growth to a longer guideway network with personal vehicles and buses.

CONTACT FOR FURTHER INFORMATION:

R. Maxwell, TST-41, Ext. 64494

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Urban Mass Transportation Administration

PROGRAM TITLE: Automated Guideway Transit Assessment

PROGRAM DESCRIPTION:

Federal R&D planning requires current knowledge of the operating performance of urban transportation technological innovations. The Office of Capital Assistance and the localities require an unbiased assessment of the passenger acceptance, the system economics and the implementation experience with new urban transportation technologies. The Airport and SLT Assessments project, in conjunction with the other ongoing and planned existing AGT technical and operational assessments, domestic and foreign, will develop a comprehensive AGT system performance inventory for use by Federal and local planners.

CONTACT FOR FURTHER INFORMATION:

Stanley Price, URD-10, Ext. 64022

TECHNOLOGY ASSESSMENT PROGRAM

REPORTING AGENCY: Urban Mass Transportation Administration

PROGRAM TITLE: Experimental Design

PROGRAM DESCRIPTION:

Each research and development project is formulated in terms of an experimental design which establishes project objectives, formalizes the test and evaluation activities to be conducted, and structures the form of the final report such as to disseminate maximum information for national application from an individual R&D project. An experimental design report for an engineering prototype project contains the stated project objectives, the project results in terms of those objectives, and other related information developed during the course of the project.

CONTACT FOR FURTHER INFORMATION:

J. Durham, URD-10, Ext. 64022

VI. ENERGY ASSESSMENTS

DOT has several ongoing assessments which address the problems associated with energy shortages. Especially notable is DOT participation in the following:

- The Automotive Energy Efficiency Program
- The Interagency Task Force on Motor Vehicle Goals beyond 1980, ongoing
- The railroad electrification/energy program
- Assessment of Fuel Consumption in Rail Transportation

Energy analyses are also important components in the more general modal and multimodal assessments noted earlier.

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Office of the Assistant Secretary for Systems,
Development and Technology

PROGRAM TITLE: Automotive Energy Efficiency Program (AEEP)

PROGRAM DESCRIPTION:

The AEEP is divided into three basic subprograms that provide a basis for socio-economic research: (1) Automotive Component Evaluation and Testing, (2) Assessment of Energy Efficient Vehicles in the Highway System, and (3) Vehicles-in-Use Energy Conservation. Socio-economic activities include the development of methods for forecasting vehicle miles traveled; projections and/or impacts of automotive technology on highway fatality risk and emissions; consumer, industry, and national costs projections and impacts. In addition, studies and analyses are being conducted on individual automotive manufacturing companies to determine their method and philosophy of conducting business in the following areas:

1. Pricing strategies
2. Incremental investment and payback criteria
3. Amortization policies
4. Capital cost and availability
5. Effects of non-automotive and foreign operations on the domestic automotive business

To implement these analyses, models are being developed for aggregate sales projections, car ownership distribution, and fleet mix projections. In addition, work is being initiated to develop methods for projecting automobile demand and marketing analyses.

CONTACT FOR FURTHER INFORMATION:

R. Strombotne, TST-46, Ext. 62022

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Office of the Assistant Secretary for Systems,
Development and Technology

PROGRAM TITLE: Interagency Task Force on Motor Vehicle Goals
Beyond 1980

PROGRAM DESCRIPTION:

The Interagency Task Force is attempting to establish goals for public and private sector motor vehicle programs in the post-1980 time period. There is substantial indication that cars and light duty trucks which would have significant energy conservation, safety, and emissions advantages over typical vehicles of current design could be produced by the early 1980's. The potential improvement in fuel economy exceeds the 40 percent goal for 1980 to which the automobile manufacturers have committed themselves. The interagency task force will also consider the impact of potential motor vehicle goals on consumers, the automobile industry, and the nation. The results of the study will be reported to the Energy Resources Council on January 1, 1976.

CONTACT FOR FURTHER INFORMATION:

A. Grobecker, TST-8, Ext. 69676

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Railroad Administration

PROGRAM TITLE: Railroad Electrification/Energy Program (planned for FY 1977)

PROGRAM DESCRIPTION:

Project Independence seeks to reduce our vulnerability to petroleum import disruptions -- electrification of a major segment of the nation's railroads will contribute toward this goal. FRA is in the planning stage of an electrification program wherein we are identifying the nation's and the railroad operator's benefits, which accrue from electrification, determining the incentives which the railroad industry needs to start electrification, and doing R&D where it is most cost effective in the field of electrification. We have already established that 100,000 barrels of petroleum would be saved per day if 22,000 miles of track were electrified (and 22,000 seems economically justified). Additional savings would result if modal shifts from auto and intercity truck freight occurred.

There are plans to electrify the 14 mile passenger track at the TTC. The immediate use of the electrified track will be for testing of Northeast Corridor equipment prior to putting it into revenue service and for determining cost effective methods of installing the catenary system. In addition, the railroad industry will be surveyed to determine what use they may have for the facility.

CONTACT FOR FURTHER INFORMATION:

Richard Novotny, RRD-22, Ext. 69564

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Federal Railroad Administration

PROGRAM TITLE: Assessment of Fuel Consumption in Rail Transportation

PROGRAM DESCRIPTION:

Previous attempts to estimate energy consumption of various forms of rail transportation have been based on calculation of overall averages from ICC transportation and fuel usage figures. In order to consider specific categories of situations, the energy inherent to specific transportation operations must be determined. A theoretical determination must include a careful delineation of all the energy-dissipating mechanisms: rolling and aerodynamic resistance, braking, idling, locomotive power generation and conversion losses. Application of this formulation to a wide variety of cases can then provide a good measure of both average fuel consumption and sensitivity of energy requirements to a large number of operating parameters.

Investigations are currently underway to determine the actual fuel consumed to move goods by rail in branch line, unit train, mixed freight and dedicated intermodal freight service. This data will be used in validating an existing analytical simulation model developed to predict energy requirements under differing freight service conditions. In addition, an assessment is being made of the most promising means of increasing rail fuel efficiency within the constraints of existing operational requirements and basic locomotive technology. Areas specifically warranting attention include but are not necessarily limited to:

A. Operations/policy

1. Line-haul
2. Terminal and others

B. Locomotives

1. In-service equipment
2. Improvements within technical state-of-the-art

CONTACT FOR FURTHER INFORMATION:

Arne J. Bang, RRD-12, Ext. 60855
John Koper, RRD-12, Ext. 60855

VII. ENVIRONMENTAL ASSESSMENTS

As mentioned in Mr. Daddario's letter, the National Environmental Policy Act of 1969 requires the generation of environmental impact statements for many federally funded transportation projects. Many other projects support this process, either by developing new evaluation methodologies or actually conducting assessments. These include the following projects:

- Technology for Environmental Analysis
- Guidelines for the Social and Environmental Assessment of Transportation Alternatives
- The Costs of Implementing Transportation Control Measures in Urban Areas
- Operational Restrictions as an Environmentally Advantageous Alternative to Increasing Highway Capacity

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: Office of the Assistant Secretary for Systems,
Development and Technology

PROGRAM TITLE: Technology for Environmental Analysis

PROGRAM DESCRIPTION:

This program is designed to develop unified technological capabilities and tools necessary to support the development in the Office of the Secretary and the operating administrations of planning procedures related to the environmental impact of transportation systems and facilities.

This effort provides technological capabilities and tools needed to support the development of planning procedures related to the assessment of environmental impacts of transportation systems and facilities, the reduction of adverse impacts, and the enhancement of beneficial ones. It includes the tasks of analysis techniques development, measurement and instrumentation technology, control technology, systems analysis, and liaison and coordination between this Department and other Federal agencies in the consideration of the technical aspects of the environmental impact of transportation systems and facilities.

CONTACT FOR FURTHER INFORMATION:

R. Strombotne, TST-46, ext. 62202

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: U.S. Department of Transportation, Office of the
Secretary, Office of Environmental Affairs

PROGRAM TITLE: Guidelines for the Social and Environmental Assessment
of Transportation Alternatives

PROGRAM DESCRIPTION:

This effort is designed to provide the means for improving the quality of environmental analysis for transportation projects, and of the corresponding environmental impact statements required by the National Environmental Policy Act of 1969. The end products will be a series of handbooks on environmental analysis of proposed highway, airport and public mass transportation projects. The first phase of this research has focused on environmental issues and impacts associated with Federally-assisted highway construction. The second phase will expand the guidelines effort by focusing on the environmental analysis of airport development projects.

FUNDING: FY 74 - \$172,000 FY 75 - \$134,000 FY 76 - \$140,000

CONTACT FOR FURTHER INFORMATION: Robert P. Thurber, TES-70, 426-4396

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: U.S. Department of Transportation, Office of the
Secretary, Office of Environmental Affairs

PROGRAM TITLE: The Costs of Implementing Transportation Control
Measures in Urban Areas

PROGRAM DESCRIPTION:

The project is designed to provide assistance to States and metropolitan areas in analyzing the costs and administrative support necessary for the implementation of transportation control strategies as required under the Clean Air Act. The project will study in depth one major metropolitan area where extensive transportation controls have been imposed, and draw conclusions with respect to the cost effectiveness of these and alternative control measures. A follow-up phase will test and validate in other selected urban areas the analytical techniques developed in the detailed case study.

FUNDING: FY 75 - \$155,000 FY 76 - \$170,000

CONTACT FOR FURTHER INFORMATION: Lee Wallerstein, TES-70, 426-4391

TECHNOLOGY ASSESSMENT PROGRAMS

REPORTING AGENCY: U.S. Department of Transportation, Office of the
Secretary, Office of Environmental Affairs

PROGRAM TITLE: Operational Restrictions as an Environmentally
Advantageous Alternative to Increasing Highway Capacity

PROGRAM DESCRIPTION:

The purpose of this study is to explore operational restrictions which might be implemented to accommodate peak period congestion, as an alternative to highway construction. The emphasis is on roadways congested by heavy volumes of recreational traffic on a seasonal or weekend basis. The effects of conflicting operating characteristics of different types of vehicles (passenger cars, recreational vehicles, trucks, and buses) on highway capacity are being studied. Operational restrictions under consideration include traffic metering, priority treatment for specific vehicle types, and collection of user fees.

FUNDING: FY 76 - \$50,000

CONTACT FOR FURTHER INFORMATION: Ms. Camille Cleveland, TES-72, 426-4396